

REMARKS

The abstract of the disclosure is objected to because "it does not describe the subject matter". (Action, page 2, line 2 under the heading "Specification"). The Office is requiring complete revision of the abstract of the disclosure.

The basis for the Office's position that the abstract fails to describe the subject matter of the application is unclear to applicants. The abstract of the disclosure describes the method of the present invention for producing a triarylsulfonium salt as disclosed in the present application. However, based on the Office's citation of MPEP §608.01(b), applicants believe the Office's position to be that the abstract of the disclosure must identify the use of the compound produced by the method of the present application.

The abstract of the disclosure has been amended to recite that the triarylsulfonium salt is useful as an acid-generating agent for a resist or a photo cationic polymerization initiator. This amendment is supported by the description on page 1, lines 6 to 8, of the specification of the present application. The abstract has also been amended to precisely define the structure of the triarylsulfonium salt produced by the method of the present invention, i.e., a triarylsulfonium salt having a structure that

only one of the three aromatic rings of the three aromatic rings on the cationic portion is different from the other two aromatic groups, and to reduce the length of the abstract.

Prior to discussing the prior art rejection of the claims, applicants note that new claims 9 and 10 have been added to the application. Claim 9 recites that the reaction of the diaryl sulfoxide and the aryl Grignard reagent is conducted in the presence of the activator of 4.5 to 7.5 equivalents relative to the diaryl sulfoxide. Claim 9 is supported, *inter alia*, by the description on page 38, lines 10 to 18, of the specification of the present application. Claim 10 recites that the same reaction is conducted in the presence of the activator of 5 to 7.5 equivalents. Claim 10 is supported by original claim 1 and Experimental Example 3 (Example 1) (refer to Table 5 on page 46 of the specification) in which 5 equivalents TMSCl is used.

Claims 1 to 22 [sic, 1 to 8] are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (U.S. Patent No. 5,633,409; hereinafter "Watanabe") in view of Dektar et al. (U.S. Patent No. 4,980,492; hereinafter "Dektar").

The Office cites Watanabe as disclosing the method recited in claim 1 of the present application except for the use of a strong

acid in the second step. Dektar is cited as teaching a process using a strong acid in a second step.

Applicants respectfully submit (1) that the Office has not correctly identified the differences between the method of Watanabe and the method of the present invention, (2) that the combination of Watanabe and Dektar proposed by the Office fails to teach all the limitations of the method of the present application, and (3) that the experimental data of the specification of the present application show unexpected results sufficient to rebut the Office's case of obviousness.

The method of the present invention produces the triarylsulfonium salt in a high yield by using a larger amount of activator, i.e., 3 to 7.5 equivalents relative to the diaryl sulfoxide, than had been conventionally used, without having problems such as the formation of by-products as impurities.

Watanabe discloses a method for producing a triarylsulfonium salt by reacting bis(p-ter-butoxyphenyl)sulfoxide (a diaryl sulfoxide), a trimethylsilylsulfonate compound (activator) and an aryl Grignard reagent (see col. 3, lines 22-29). However, Watanabe fails to disclose use of the activator in an amount of 3 to 7.5 equivalents relative to the diaryl sulfoxide. The amount of the trimethylsilylsulfonate compound as activator disclosed in Watanabe

is 1 to 2 mole per mol of the diaryl sulfoxide, i.e., 1 to 2 equivalents relative to the diaryl sulfoxide. This is clear from the amount of the trimethylsilylsulfonate compound (activator) used in Synthesis Examples 2 to 7 of Watanabe as shown in Table 1 below.

[Table 1]

Watanabe	Ar-SO-Ar (mol)	Me ₃ SiY (Y=OTf or Ots) (mol)	Me ₃ SiY/Ar-SO-Ar (eq.)	Yield (%)
Synthesis Example 2	0.12	0.13	About 1	25
Synthesis Example 3	0.087	0.17	1.95	50
Synthesis Example 4	0.12	0.24	2	39
Synthesis Example 5	0.05	0.1	2	30
Synthesis Example 6	0.029	0.058	2	38
Synthesis Example 7	0.12	0.24	2	35

As can be seen from the data of Table 1, in Watanabe an amount of the trimethylsilylsulfonate compound is 1 to 2 equivalents relative to the diaryl sulfoxide.

The results of Synthesis Examples 2 to 7 of Watanabe indicate that Me₃SiY/Ar-SO-Ar of 1.95 equivalents is the best amount for

producing the triarylsulfonium salts and that the yield decreases if the ratio is increased to 2 equivalents. Furthermore, the yield of triarylsulfonium salts obtained by the method of Watanabe is low (25-50%). Therefore, in Watanabe there is no disclosure or suggestion of the use of an activator in an amount of 3 to 7.5 equivalents relative to the diaryl sulfoxide as recited in the claims of the present application.

Dektar discloses a method for producing a triarylsulfonium salt in two steps (see col. 1, lines 32-40, reaction scheme). In particular, there is a disclosure of a method for producing triarylsulfonium salt which comprises reacting the diaryl sulfoxide and the aryl Grignard reagent, followed by hydrogen halide (the first step), and then reacting the resultant reaction mixture with strong acid (ZMF₆) (the second step). There is no disclosure or suggestion in Dektar of use of an activator as in Watanabe or as in the present invention, e.g., a halogenotriorganosilane, in the first step.

Dektar does not overcome the insufficiencies of Watanabe to disclose or suggest the use of an activator in an amount of 3 to 7.5 equivalents relative to the diaryl sulfoxide. Therefore, the combination of Watanabe and Dektar proposed by the Office will not result in the method recited in claims 1 to 10 of the present

application. For this reason alone, the 35 U.S.C. 103(a) rejection of the claims is improper.

Moreover, the method of the present invention shows unexpected excellent results as shown in Table 5 on page 46 of the specification of the present application.

In Table 5, yields of the obtained objective compound and by-products are described when using chlorotrimethylsilane (TMSCl) as the said activator of 2.5, 3.0, 4.0, 5.0, 6.0, 7.0, 7.5 eq., respectively relative to 1 eq. of the diphenyl sulfoxide.

As is clear from the results of Comparative Example 1 on Table 5, it can be understood that use of TMSCl as the activator of 2.5 eq. relative to the diphenyl sulfoxide, forms not only by-products, but also the objective compound with low yield (59%).

In contrast, as shown in the results of Experimental Examples 1 to 6, use of TMSCl (activator) of 3 to 7.5 eq. relative to the diphenyl sulfoxide, forms by-products in extremely low yield and can obtain the objective compound with a high yield. Especially, it can be understood that use of TMSCl of 5.0, 6.0, 7.0 and 7.5 eq. does not form any by-product in Experimental Examples 3 to 6.

These results are not suggested by the prior art and do not flow naturally from the prior art. Therefore, the unexpected results demonstrated by the data of the application are sufficient

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to rebut any *prima facie* obviousness considered by the Office to be supported by the cited prior art.

For the above reasons, removal of the 35 U.S.C. 103(a) rejection of the claims is believed to be in order and is respectfully requested.

The foregoing is believed to be a complete and proper response to the Office Action dated July 23, 2007.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension and any additional fees that are required may be charged to Deposit Account No. 111833.

Respectfully submitted,
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